

In The Claims:

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1 1. A method for transmitting
2 communications signals to a plurality of mobile
3 terminals, comprising:
4 processing a received signal at a ground
5 hub;
6 radiating said signal through multiple
7 paths to at least two satellites;
8 re-radiating said signal from said at least
9 two satellites to an intended mobile terminal;
10 perturbing the inclination and eccentricity
11 of said at least two satellites relative to the same
12 geosynchronous reference orbit;
13 whereby the periods of geosynchronous
14 orbits of said at least two satellites remain
15 substantially constant.

1 2. The method of claim 1, further
2 comprising:
3 radiating a signal from said intended
4 mobile terminal to said at least two perturbed
5 satellites;
6 re-radiating said signal from said at least
7 two perturbed satellites to said ground hub.

1 3. The method of claim 2, further
2 comprising:
3 determining a relationship between said
4 inclination and said eccentricity of said satellites

5 such that they appear to move at a constant speed
6 along circular paths whose centers are located at the
7 position of a hypothetical reference satellite in an
8 unperturbed geosynchronous orbit.

1 4. The method of claim 3, further
2 comprising:

3 maintaining the geometry of said cluster of
4 at least two satellites such that the distances
5 between any two of said satellites is relatively
6 constant.

1 5. The method of claim 4, further
2 comprising:

3 adding additional satellites to said at
4 least two satellites to augment the satellite
5 constellation.

1 6. The method of claim 4, wherein the
2 conditions for circular apparent motion of the
3 perturbed satellite relative to said satellite
4 constellation center is approximated by the
5 following:

$$\sin i = 2\epsilon$$
$$t_o = \pm \frac{1}{4} T_{GEO}$$

1 7. A mobile wireless communication
2 system, comprising:

3 a satellite constellation consisting of a
4 plurality of satellites each in a slightly perturbed
5 geosynchronous orbit;

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6 each of said plurality of satellites being
7 capable of relaying signals between the ground hub
8 and the plurality of user terminals in either
9 direction;

10 whereby as said satellite constellation
11 appears to rotate the apparent inter-satellite
12 spatial relationships are maintained.

1 8. The mobile wireless communication
2 system of claim 7, wherein each of said plurality of
3 satellites has its inclination and eccentricity
4 perturbed relative to a common geosynchronous
5 reference orbit.

1 9. The mobile wireless communication
2 system of claim 8, wherein the orbit of each of said
3 plurality of satellites is perturbed such that it
4 appears to move at a constant speed along a circular
5 path as viewed by a single user.

1 10. The mobile wireless communication
2 system of claim 7, wherein the respective distances
3 among the said plurality of satellites is
4 substantially constant.

1 11. The mobile wireless communication
2 system of claim 9, wherein the conditions for
3 circular apparent motion of the perturbed satellite
4 relative to said satellite constellation center is
5 approximated by the following:

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$$\sin i = 2\varepsilon$$

$$t_o = \pm \frac{1}{4} T_{GEO}$$

6

1 12. The mobile wireless communication
2 system of claim 7, wherein in order for coherent
3 reception of signals by their intended user, said
4 intended user's location must be determined to within
5 a specified tolerance ε_x , which is determined
6 according to the following equation:

$$\varepsilon_x < \frac{\varepsilon_{tol} \lambda_{min} r_{min}}{\Delta D_{x max}}$$

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1 13. The mobile wireless communication
2 system of claim 7, wherein in order for incoherent
3 reception of signals from interfering (non-intended)
4 users, said interfering users must be displaced at
5 least a distance

$$\Delta x_{min} \geq \frac{cr_{max}}{2W_N \delta \Delta D_{x min}}$$

6

7 from the user receiving the signal

1 14. The mobile wireless communication
2 system of claim 11, wherein the apparent motions of
3 said plurality of satellites in said satellite
4 constellation can be arranged to appear circular as
5 perceived from any one point in the coverage area.

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1 15. A method for establishing a link
2 between a ground hub and a plurality of mobile
3 terminals, comprising:

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$$\sin i = 2\varepsilon$$

$$t_o = \pm \frac{1}{4} T_{GEO}$$

1 19. The method of claim 15 wherein in
2 order for incoherent reception of signals from
3 interfering (non-intended) users, said interfering
4 users must be displaced at least a distance

$$\Delta X_{MIN} \geq \frac{C r_{MAX}}{2 W_N \delta \Delta D_{xMIN}}$$

5 from the user receiving the signal.

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6 20. The method of claim 15, wherein in
2 order for coherent reception of signals by their
3 intended user, said intended user's location must be
4 determined to within a specified tolerance ε_x , which
5 is determined according to the following equation:

$$\varepsilon_x \ll \frac{\varepsilon_{tol} \tau_{min} r_{min}}{\Delta_{x min}}$$

1

4 preprocessing a received signal at said
5 ground hub;

6 transmitting said signal through a
7 plurality of satellites in a satellite constellation
8 to an intended one of the mobile terminals;

9 perturbing the inclination and eccentricity
10 of said plurality of satellites relative to a common
11 geosynchronous reference orbit; and

12 determining a relationship between said
13 inclination and said eccentricity of said plurality
14 of satellites such that they appear to move at a
15 constant speed along circular paths where centers are
16 located at a position defined by a hypothetical
17 reference satellite in an unperturbed geosynchronous
18 orbit.

1 16. The method of claim 15, further
2 comprising:

3 maintaining the periods of geosynchronous
4 orbit of said plurality of satellites substantially
5 constant.

1 17. The method of claim 15, further
2 comprising:

3 maintaining the apparent inter-satellite
4 spatial relationships between said plurality of
5 satellites as they appear to rotate.

1 18. The method of claim 15, wherein said
2 relationship is approximated by the following:

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